

DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Electric-Arc Furnace for Melting Synthetic Slag.

We, CHELYABINSKY METALLURGICHESKY
ZAVOD, of p/o 17, Chelyabinsk, Union of
Soviet Socialist Republics, a corporation
organised and existing under the laws of the
Union of Soviet Socialist Republics, do
hereby declare the invention, for which we
pray that a patent may be granted to us,
and the method by which it is to be per-
formed, to be particularly described in and
by the following statement:—
This invention relates to electric-arc
furnaces used for melting charge materials,
for example, synthetic slag, used in metal-
lurgy for refining molten metal.
Already known are stationary electric-arc
furnaces for melting synthetic slag which
have a housing with a lining, an arch with
electrodes passing therethrough, mechan-
isms for moving these electrodes, and cool-
ing devices built into the furnace walls.
Such a furnace is loaded with charge
materials through a door in the wall of the
furnace housing.
Frequent opening of the door of a furnace
having a comparatively small volume causes
sharp fluctuation of the temperature within
the furnace, and this fluctuation has an ad-
verse affect on the life of the lining of the
walls and arch, resulting in wear of the
shoulders and reduction of durability of the
electrodes.
The charge material is mostly concen-
trated at the charging door and not uni-
formly charged during the process of melt-
ing. This results in considerable fluctuations
[Price 5s. 0d.]

of the molten slag temperature and there-
fore in the electrical resistance of the melt
so that the electric capacity of the furnace
cannot be maintained constant.

Furthermore, the suction of cold air
through the gaps around the charging door
adversely affects the furnace capacity.

An object of the present invention is to
eliminate or reduce the above mentioned
disadvantages.

The main object of the invention is to pro-
vide an electric-arc furnace of higher
capacity for melting synthetic slag, to elim-
inate or reduce the ingress of air during the
charging of the furnace and to ensure longer
life of the walls and arch of the furnace.

This invention consists in an electric-arc
furnace, for melting synthetic slag, covered
by an arched roof, in which the arched roof
has an annular slot formed therein, this slot
being covered by a rotatable annular cover
which is connected to at least one movable
charging bunker adapted to travel around
the furnace in conjunction with the cover,
charge materials for the furnace being sup-
plied into the furnace from the charging
bunker through an opening in the cover.

Preferably the sealing between the annular
cover and the furnace arch is effected by
two hydraulic seals situated around the in-
ternal and external perimeters of the annular
cover.

The invention is further described by way
of example with reference to the accom-
panying drawing in which a furnace accord-

ing to the invention is shown in elevation.

The furnace has a cylindrical housing 1 with a lining 2 and a bottom 3. The furnace bottom is provided with shoulders 4 arranged near the walls. Into the wall lining are built metal cooling members 5, located above the shoulders and within the height of the molten slag. The cooling members alternate with sections of refractory material.

In front of the metal cooling members 5 and above the bottom and shoulders is disposed a temporary screen 6 (shown in the drawing in dotted lines). Above the level of the molten slag are placed supporting coolers 7 which are fixed to the housing and serve to support the overlying wall lining.

The furnace has outlets for removal of gases (not shown in the drawing), a mechanized slag outlet 8 with a mechanism 9 for discharging the synthetic slag and a tapping hole (not shown in the drawing), located at a level of the bottom 3 and used for tapping metal.

The furnace space is covered with an arch 10 through which pass electrodes 11. The annular slot 12 in the arch is provided for charging the charge materials into the furnace. The hydraulic seal 13 of a movable cover 14 is arranged around the slot 12. A carriage 15 carrying the charging bunker 16 and the drive 17 of the charging assembly as well as the stationary bunker 18 for the charge materials are located above the furnace. A pipe 19 connects the bunker 16 to the movable cover 14.

For controlling the process of melting, the arch 10 is provided with inspection holes (not shown in the drawing).

The furnace operates as follows.

The charge materials are charged into the stationary bunker 18 from which they are periodically fed into the movable charging bunker 16. The latter travels around the top of the furnace on the carriage 15. From the bunker 16 the charge materials are supplied through the pipe 19, the opening in the movable cover 14 and the annular slot 12 into the furnace near the walls and shoulders 4 around the periphery of the bath.

The hydraulic seal 13 provides sealing of the movable cover 14 closing the annular slot 12.

Such charging provides for uniform supply and distribution of the charge materials in the furnace. Electric current is fed to the electrodes 11. The temperature in the furnace and the electrical resistance of the molten slag are maintained constant and this enables the electric power consumption

of the furnace in operation to be kept constant.

The walls of the furnace are cooled by the metal cooling members 5 and by the charge materials being charged near the walls. As a result, the chemical activity of the molten slag in the vicinity of the furnace walls is reduced. This helps to increase the life of the lining of the walls and shoulders 4.

The slag is tapped through the slag hole 8 equipped with mechanism 9 provided for its opening and closing.

During the process of melting the charge materials, if the charge materials are synthetic slag containing a metal or oxides thereof, molten metal is collected on the furnace bottom. This metal is removed through another hole (not shown in the drawing). The level of the molten metal on the furnace bottom should be not less than 100 mm below the upper level of the shoulders and should not reach the level of the metal cooling members 5.

The observation of the melting process and the sampling are effected from the operator's platform through the above-mentioned inspection holes.

The presence of the loading slot with the hydraulic seal in the furnace arch helps to eliminate or reduce the suction of cold air into the furnace, to reduce the consumption of the electrodes and electric power during melting of synthetic slag and to increase the furnace capacity.

WHAT WE CLAIM IS:—

1. An electric-arc furnace, for melting synthetic slag, covered by an arched roof, in which the arched roof has an annular slot formed therein, this slot being covered by a rotatable annular cover which is connected to at least one movable charging bunker adapted to travel around the furnace in conjunction with the cover, charge materials for the furnace being supplied into the furnace from the charging bunker through an opening in the cover.

2. An electric-arc furnace as claimed in claim 1, in which a seal is provided between the annular cover and the arched roof of the furnace by means of two hydraulic seals situated around the internal and external perimeters of the annular cover.

3. An electric-arc furnace substantially as hereinbefore described, with reference to and as shown in the accompanying drawing.

MARKS & CLERK,
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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

